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RECORDS OF HEALTH AND SANITARY PROGRESS.

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Health and safety have not been the fundamental considerations in locating and building our cities. Population has concentrated in certain centers because they were favorable for productive enterprises or mercantile operations. These communities may be swept by flood or earthquake and they are rebuilt in an incredibly short time. Bad housing and sanitation have cost thousands of lives each year, but the tide of population is not turned back from the city. Bad working conditions are responsible for scores of thousands of crippled and inefficient workers and yet the laborers continue to submit themselves to the dangerous conditions. The desire for economic advantage has made some forgetful and others reckless of human welfare and individual happiness. The pressure of economic necessity has prevented many from asserting their rights to better living and working conditions. Ignorance of the facts has kept silent many who would otherwise have protested.

The city should know more about itself. If it is to become more than a labor market and place of business; if it is to be made a healthy and comfortable place in which to live as well as to work, more exact data should be recorded concerning the bad effects of certain city conditions upon the health and welfare of the urban population. A great advance in this sort of knowledge already has been made. Such information is leading to a policy of city planning instead of allowing cities to grow up haphazard. Every addition to our knowledge reveals the lack of proper adjustment, the existence of selfish exploitation and the absence of coöperation for the common welfare.

A scientific laboratory is a place where observations are made and recorded; where the conditions of an experiment are carefully arranged and the results noted; where the relations of cause and effect are investigated. There is a sense

in which the city may serve as a health laboratory. Observation and analysis of the phenomena as we find them may reveal relations of cause and effect which are of the greatest significance in community action for the common welfare. The term "survey," recently applied to the effort of a community to find out the facts about itself, emphasizes the same viewpoint.

One of the most active health campaigns is directed against the high infant death rate. Miss Julia C. Lathrop, chief of the Children's Bureau, finds that 42 per cent. of the babies dying within the first year of life die within the first month.* Of this number about seven tenths die, according to the same authority, as a result of conditions existing before they were born or as a result of injury or accident at birth. How much of this high mortality may rightly be attributed to the work of the mother and her working environment, or to long hours of work up to the time of childbirth? How many health departments attempt to relate infant deaths to the work of the mother? A special investigation recently made by agents of the Bureau of Labor presents data on this problem for Fall River and certain other Massachusetts towns,† but there is need of a constant and widespread analysis of the infant deaths in every city according to the occupation of the mother and her hours of work. How else can it be determined what legislation is needed providing for a period of cessation from work before and after childbirth and for the regulation of employments dangerous to the health of the mothers of the generation yet unborn?

Dr. Watson S. Rankin, Secretary of the North Carolina Board of Health, tells of a town in his state which had required a railroad to build an overhead bridge at a cost of \$18,000 because, during a period of ten years, ten fatal accidents had occurred at that crossing. The interest on the original cost of the bridge plus the annual wear and tear would amount to at least \$1,500 per year. This sum the company was compelled to pay each year to save one needless death. The authorities of this town of 4,000 population were spending

* Prenatal Care, Publication No. 4, United States Children's Bureau, Washington, D. C. 1913, p. 5.

† Report on Condition of Women and Child Wage-Earners in the United States, Sen. Doc. 645, Vol. 13, 61st Cong., 2nd Sess., 1912.

\$150 annually in their health administration. A visit to their registrar of vital statistics showed how many needless deaths from various causes had been occurring each year. The general death rate was 27.5 per 1,000 population, which was 12.5 persons in each thousand higher than the rate for the average community. Therefore, about fifty lives were being needlessly sacrificed each year. Their death rate from tuberculosis was twice the average and from typhoid more than seven times the average. This was a sick town, but it was unconscious of the real health situation, and, therefore, inconsistent in measures for health preservation.*

The discovery of the typhoid bacillus and the knowledge of its mode of entrance into and its exit from the body has led to the recognition that typhoid fever is a preventable disease. In theory, it is possible to eradicate this disease completely by protecting food and water from all contamination and by the destruction of all typhoid germs excreted from the body. The degree of success with which this knowledge has been applied varies greatly in European and American cities. The typhoid death rate per 100,000 of population in Paris, in 1910, was 6.7; in Vienna 4.1; in London 4.0; in Berlin 3.6, and in Hamburg 2.5. These and other European figures show an average mortality from typhoid of about 4 per 100,000. The showing of the cities of 100,000 and over in the United States in comparison is not flattering. Of the fifty such cities in 1910 only four showed a typhoid rate of 9.5 per 100,000 or less, while nine of these cities exceeded 40 deaths per 100,000 of population. The average rate for the fifty cities was 25 deaths per 100,000, about six times the European rate.† Evidently, there are many difficulties in the campaign of prevention to be carefully analyzed and wisely solved in this country.

THE UTILITY OF VITAL RECORDS.

If we would secure better statistics of births, deaths, and sickness, it is necessary to show for what purposes they may be used.

* The Influence of Vital Statistics on Longevity, W. S. Rankin, *The American Underwriter*, January, 1913, pp. 2-3.

† Monthly Bulletin of the State Board of Health of Massachusetts, February, 1913, pp. 57-59.

(1) *Vital statistics are the bookkeeping of the health movement.* Population is added to by births and subtracted from by deaths. Sickness and disability data measure the possible efficiency of the existing population. Whatever affects either births or deaths, conditions the very existence of the population. That which causes sickness and disability conditions efficiency and happiness. By reducing the death rate the healthy increase of the population may be maintained with a lower birth rate and without the burdens connected with the rearing of children and with sickness and death.

Too often the profit and loss account of a business firm has kept no record of the human wear and tear or of the human gains of certain business policies. Vital records should supply this neglected information. Laws may make it to the financial interest of the employer to count these human wastes and to prevent them. At present we must depend upon estimates of how many fatal accidents and non-fatal injuries occur in industry each year, or how many workers in lead or other dangerous substances are poisoned. Why should a probable annual toll of 30,000 fatal accidents in industry in the United States or of 2,000,000 non-fatal injuries be left to estimate? A careful analysis of facts, conscientiously recorded, would show the effect of the adoption of safety devices or the losses which result from neglect of safety precautions. When the New Haven Railroad has an accident causing the loss of a score of lives, it is made a matter of several public inquiries, with the effort to show the causes and whether the loss of lives might have been prevented. What of the army of laborers who are destroyed or maimed each year in industry? We need to know where and how and why in all these cases in order that the community may be informed of its wastes of human life and efficiency. Even employers themselves need to be shown by a careful record that the removal of dust and poisons from the factory or the protection of the worker from their effects brings about less lost time through the sickness of employees, and enables the worker to turn out more and better products.

Likewise with preventable disease and sickness. We must depend upon the estimate of 150,000 deaths annually from

tuberculosis in the United States and of 500,000 persons continually ill from the same disease.* Analysis of the facts of this disease which causes one tenth of all deaths, and that largely during the productive period from 25 to 45 years of age, must result in fixing responsibility upon housing and working conditions, and upon ignorance. Since the disease is recognized as preventable the records ought to show what methods have yielded the best results in reducing mortality and sickness. The measure of success or failure of preventive work is found in vital statistics.

It is estimated that 300,000 babies in the United States died last year before they were one year old.† The records of this appalling waste of infant life, carefully analyzed, ought to show the causes and make clear the lines of preventive activity. No business firm would dare to be as careless of raw material and mechanical equipment as our communities have been of life and health. No one can estimate the poverty and misery which result from such neglect. There is the greatest need for careful community records of the human losses and gains in the struggle for progress.

Birth statistics are less accurately collected in most of our states than deaths, but the immediate public record of a child's birth is of absolute importance to the health authorities. In case the family cannot afford adequate medical and nursing care aid may be furnished at once to mother and child. New York City employs the school nurses during the summer in the campaign against infant mortality in addition to the regular staff of infant nurses. A number of infants are assigned to each nurse, whose duty it is to visit the homes and instruct the mothers on the care of the babies and to secure medical and other care where needed. Obviously, this method of work, whether by municipal or volunteer agencies, is greatly facilitated by early and complete registration of births.

(2) *Vital statistics show us where to look for bad health conditions and demonstrate the success or failure of a new health policy when adopted.* To the health official and investigator

*Report on National Vitality, Irving Fisher, Bulletin 30 of the Committee of One Hundred on National Health, 1909.

† Prenatal Care, op. cit., p. 5.

they serve the same purpose as symptoms to the physician. To the sanitarian they are what chart and compass are to the navigator. Arthur Newsholme, the English statistician, declares that modern sanitary science owes its existence to the registration of deaths and their causes. Frederick L. Hoffman maintains that vital statistics alone furnish a definite measure of the value of sanitary improvement and the progress of medicine and surgery.

In 1907 the typhoid death rate of Pittsburgh was 130.8 per 100,000 of population, which showed criminal neglect by the community in the face of sanitary knowledge. The following year showed a rate of only 46.6—after a filter plant had been installed. The further extension of the use of filtered water and the better enforcement of other sanitary provisions reduced the rate to 25.9 in 1911.* Thus, within a period of four years, the rate had been reduced four fifths, and in the single year of 1911 over 500 lives were saved which would have been needlessly sacrificed to this one disease if the old rate of 1907 had prevailed. This sort of record-keeping convinces the community that a specific health policy is worth while. It demonstrates to the health department itself, by comparison with the results of other policies, the most effective method of saving lives and preserving health.

The last four summers have been noteworthy in the health movement in New York and other cities because of the success of certain plans for the reduction of infant deaths. Milk depots were opened, either under the direction of private associations or the health authorities, nurses and doctors were detailed to give instruction to the mothers and to care for the babies both at the stations and in the homes. The careful weekly record of the vital facts during the dangerous months of mid-summer tell a story of success and measure the extent of it by comparison with preceding efforts. The wisdom of this form of effort and expenditure has been demonstrated. The belief that ignorance is fundamental in the infant mortality problem has been demonstrated beyond a doubt.

It has been shown that the method of feeding is an important element in the infant problem, yet, no health department, so

* Annual Report of the Dept. of Public Health, Pittsburgh, Pa., 1911-1912, p. 56.

far as the writer is informed, attempts regularly to correlate infant deaths with the method of feeding. The facts of this relationship are essential in an educational campaign among the mothers in the effort to reduce mortality. Dr. William H. Davis, Vital Statistician of the Boston Health Department, has conducted a special investigation in Boston, the results of which were presented at the International Congress on Hygiene at Washington in September, 1912.* One of the chief objects of milk-station and home instruction of mothers before childbirth is to cause more mothers to nurse their babies and better prepare them for doing so. If we are to measure the effectiveness of this method, we should collect the information as to the method of feeding in the case of each infant death, as a test of the educational and prenatal work. The dangers of the artificial food supply of the infant are connected with the ignorance of sanitation and with the bad living conditions amid which so many of the poorer classes rear their children.

(3) *Vital statistics may be related to other social phenomena such as occupation, housing, and nationality.* To analyze this relationship often points the way for an effective preventive campaign. What answer can most health departments give to the question of the relative morbidity and mortality from specific causes in different occupations? Yet, the occupation is recorded on the death certificate and many of our communities are carefully registering and supervising cases of tuberculosis. We find the insurance company making a detailed analysis of deaths by occupation because it is in the interest of its business to measure the variety of risks involved in different occupations. Such an analysis by the Prudential Insurance Company is shown in the following table:

*Transactions of the Fifteenth International Congress on Hygiene and Demography, Washington, D. C., 1912, Vol. 6, pp. 184-190.

PROPORTIONATE MORTALITY BY CAUSES AND OCCUPATIONS, AGE 15 AND OVER.
PRUDENTIAL INSURANCE COMPANY, 1907-1910.^a

Cause of death.	All Occu- pied Males.	Farm- ers.	Clerks.	Coal Miners.	Iron and Steel Work- ers.	Car- pen- ters.	Paint- ers.	Plumb- ers.	Print- ers.
Typhoid	1.8	1.3	3.0	2.0	2.2	1.0	1.3	2.5	2.3
Alcoholism	1.5	.3	.8	.6	1.0	1.1	1.4	1.9	1.6
Cancer	4.3	6.1	2.1	2.7	4.6	5.7	3.4	3.4	2.4
Tuberculosis	21.9	10.2	36.7	11.1	19.4	16.1	23.8	32.9	38.4
Old age .....	.9	2.9	.2	.2	.8	1.4	.6	.1	.1
Apoplexy and paralysis	7.8	14.6	4.6	6.1	7.1	10.9	8.4	4.7	4.1
Other nervous diseases	2.7	2.5	3.5	1.6	2.9	2.7	2.3	3.2	3.0
Heart diseases	9.2	12.7	7.9	6.8	8.8	11.4	8.1	5.2	10.0
Pneumonia	8.9	8.3	8.1	11.4	9.7	7.8	7.4	7.7	8.1
Other respiratory diseases	3.4	3.6	2.2	9.3	2.8	3.3	2.5	1.7	2.6
Liver diseases	2.9	2.1	2.2	2.5	2.3	2.5	2.7	2.6	3.2
Other digestive diseases	4.1	4.9	4.3	3.9	4.6	4.3	3.7	4.5	3.8
Urinary diseases	12.0	12.9	9.6	8.0	9.9	13.4	15.1	11.1	8.9
Accidents	9.3	5.8	6.7	22.9	15.3	7.8	8.6	11.7	5.7
Suicide	2.2	1.6	1.9	.9	1.8	2.7	2.9	1.9	2.0
Lead poisoning .....	.1	.....	.....	.....	.....	.....	1.5	.....	.....
All other causes	7.1	10.2	6.5	10.1	6.8	8.0	6.5	5.0	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^a Exhibits of the Prudential Insurance Company at Fifteenth International Congress on Hygiene and Demography, Washington, D. C., 1912 (Compiled). Percentages copied as in the original but they do not always add to 100.0%.

A glance at the above table* reveals a widely different mortality for different occupations from such causes as tuberculosis, urinary diseases, and accidents. This is preliminary information to the discovery of why mortality is high from specific causes in certain occupations. We need constant analysis of all mortality returns and cases of reported illness by occupation. Regulation of conditions which destroy health and sacrifice lives will surely follow. Special inquiries, such as that recently made in Illinois by Dr. Alice Hamilton or in New York State by the Factory Investigating Commission, to discover the nature and extent of lead poisoning in industry, are not adequate.†

The report of the New York Congestion Committee‡ and special studies on housing made in Chicago§ and Boston|| emphasize the close relationship between housing and health.

*To bring out the real significance of these figures the deaths must be analyzed by divisional periods of life. This the Insurance Company has done in each occupation.

† Preliminary Report of the Factory Investigating Commission of New York State, 1912, Vol. I, Appendix VI.

‡ Report of the New York City Commission on Congestion of Population, 1911.

§ American Journal of Sociology, September, 1910, to September, 1911.

|| Report of the Homestead Commission of Massachusetts, Boston, 1913.

It is admitted that crowding has a vital relation to the problems of tuberculosis and infant deaths. But how many cities have any exact and continuous data as to the extent of room-crowding and its relation to the death rate? The numbers living per acre in various sections are not comparable because no account is taken of the part of the area devoted to other purposes than residence or of the varying heights of dwellings. Therefore, we have not the data to measure the influence of congestion upon health with even an approach to accuracy. Yet, only by measuring the bad effects of the city environment upon the people who dwell there will the movement for city planning secure its effective motive power and justify, in the eyes of those unaffected by artistic motives, the large expenditures needed to make the city a healthy place in which to live.

Mortality and morbidity rates vary among different nationalities. For instance, the infant mortality and tuberculosis rates are much lower among the crowded Hebrew population of the lower East Side in New York than on the much less crowded West Side where different nationalities dwell.* A large proportion of our immigrant population is coming into a city environment which is utterly different from that to which they have been accustomed. Ignorance is the most serious menace to their health. Urban conditions become especially dangerous in this situation. For this reason it is very important that sickness and mortality data be analyzed by nationality and specific causes. Year by year the cases of reported illness and the deaths from tuberculosis among the foreign-born and those of foreign descent should be correlated with the number of years spent in this country, in order to measure how the new environment registers its effects upon the health of the immigrant. Knowledge of the facts would lead more surely to wise provisions to control the disease before it has gained too strong a foothold, including an educational policy to aid adjustment in the new surroundings. In northern cities the death rate of the colored race from tuberculosis is two or three times the rate for whites. Adjustment to the city life is not successful and the race would die out if not recruited constantly from the South. Employment is

* The Waste of Infant Life, Edward T. Devine, Survey, December 4, 1909.

intermittent, housing conditions are bad, incomes are low, and rents are high. There is complete ignorance of sanitary precautions. Therefore, the race has fallen a victim to tuberculosis. It is a menace to the health of the community to neglect the health of any part of its population. The effects of city conditions should be measured and then such policies may be adopted as will counteract the bad effects and promote the good influences.

(4) *Vital statistics have a most important practical bearing upon the problems of widows' pensions and minimum wage.* It may be expedient to grant pensions to widows but it is not a complete solution. If granting such pensions should lead the community to believe that by so doing it had fulfilled its entire responsibility the plan would be an unmitigated evil. A fundamental inquiry is not as to how much the widow needs from the state, but how she comes to be in need at all. At the critical period when a family was being reared did some fatal accident or preventable disease deprive the family of its natural support? If so, the logical solution is to prevent these dangers to life and health, so far as possible, and to meet by a system of social insurance the burdens which cannot be avoided. Upon such observation and knowledge is preventive work based, and a solution worked out in this manner becomes permanent.

The minimum wage idea is in danger of being regarded as a panacea for the ills of low wages. It may be expedient to have a minimum wage for certain work but the law will not endow those of low earning capacity with higher earning power. Too many are not earning more than they receive. A fundamental inquiry must not be forgotten—why are wages low? The minimum wage legislation may prove a good method of bringing into view the group with low earning power. It will then be possible to observe and measure more accurately the results of accident and disease and fatigue in decreasing earning ability, the effects of working too early in life or under bad working conditions in shortening the working life, as well as many other causes of low wages. The community will then be in a position to remedy these various causes whose combined effects are low wages.

(5) *Vital statistics make possible the wise and efficient administration of a health department.* "Public health is purchasable" reads the motto of the *Monthly Bulletin* of the Department of Health of the City of New York. Following this idea the city spends several million dollars each year in its health administration. This is a big business undertaking. The object of every health department should be to secure as large a return in lives and health as possible for a given expenditure.

The head of a business firm asks of his bookkeeper more than a statement of general results. He wishes to know what lines of effort have yielded the best returns and what, if any, have been conducted at a loss. He wishes to know the weak spots in his system of business administration in order that efforts may be concentrated at those points. Likewise, the health department of a city should ask of its bookkeeping division—the bureau of vital statistics—what causes of death are increasing and what are decreasing both in the community as a whole and in particular smaller localities? What occupations are so dangerous to health as to require regulations for the protection of the employees? In what sections of the city, among what nationality, or under what sort of industrial and living conditions is the mortality of infants high? Does the crowding in a certain area, as measured by the number of persons per room, result in a higher death rate? What is the relation of the milk supply to health? What effect has the milk station upon health? What trades are especially dangerous from the point of view of tuberculosis? Is one nationality more susceptible than another? Are the housing conditions in certain areas especially responsible for the high rate in those districts? How much lower is the rate where hospitals and sanatoria have been provided for dangerous cases, and where nursing and instruction are given in the homes? Most of these questions are not adequately answered by data collected and analyzed by the city bureaus of vital statistics. Without such information the health department is not in a position to expend its money and energy to the best advantage in preserving health.

These facts are also needed to educate the public in the health needs of the community in order that they will indorse more adequate appropriation of funds for the health department. The educational function of vital statistics, properly presented, is most important in the preventive work, where not only must the individual be made to understand the common dangers to which he is exposed, but also that he has a right, in coöperation with others, to demand protection through community agencies, such as the health department and building department of the city. The public must be brought to realize, by seeing the actual figures or a graphic device based on actual figures, to what extent a bad water supply increases the cases of typhoid; how much impure milk raises the infant sickness and death rates; that bad sanitation results in epidemics of diseases; that bad housing increases the cases of tuberculosis; and that too few food inspectors endanger the health of thousands in the community. Then the public will support additional expenditures to improve these conditions. Health departments have just begun to popularize a part of their collected data and to publish it in the form of weekly or monthly bulletins or through the newspapers. The Chicago Health Department is a leader in this form of activity. Within the last year the New York City Health Department has organized a Bureau of Public Health Education. Just as the physicians are more and more taking the community into their confidence by popularizing and publishing information on the nature and prevention of disease, so must health departments widely extend the movement for popular education to enlist coöperation in the preventive work.

The chief hindrance to effective effort in the health departments of most cities is the lack of adequate funds. We have some very significant facts, in the prosperous states of Illinois and New York, as to the compensation paid to the chief health officer in various cities. Dr. Palmer, of Springfield, Ill., reports the results of his inquiry in that state in a paper entitled, "The Shortcomings of Municipal Public Health Administration," published in the *American City* for August, 1911. He ascertained the facts in forty-four Illinois cities of 3,000 population or over. Thirty-six of these cities pay less

than unskilled workman's wages to their chief health officers. Twenty-one of the forty-four cities have no appropriation for public health purposes, or only that for the payment of the nominal salaries of officials. Two cities of over 20,000 population each propose to give health protection at a cost of \$300 per year. Twenty-nine of the forty-four cities employ no inspectors at all. While fifteen of these cities exceed 20,000 in population and three are over 50,000, not one city pays sufficient salary to its chief health officer to warrant a competent man in devoting all his time to the work. One city of 59,000 pays \$1,500 per year, the highest salary paid to any municipal health officer outside Chicago; a city of 70,000 pays \$1,200, and one of 51,000 pays \$1,000. The twelve cities paying nothing include one of 30,000, one of 22,000, and one of 21,500 population. How could the health and lives of the people be adequately protected in such a situation?

The Special Health Commission, appointed by Governor Sulzer, and reporting to the New York Legislature last year, revealed about the same situation for the cities of New York State.* The Children's Bureau at Washington, in making inquiry as to activities in various cities of the United States, in the campaign against infant mortality, received this reply from the board of health of a city of 687,029 population, dated February 20, 1913: "I have to advise that the health department has no funds available for organizing a division for the care of infants." Another health officer in a city of over 168,000 said: "We have been unable to get an appropriation from the city council for carrying on a campaign of this kind."† Therefore, it is desirable to accumulate such an array of vital facts, so clearly analyzed and presented, that the truth of the New York Health Department motto will become generally recognized—that *health is purchasable*. Then the appropriations will become more adequate. The public does not look at all or looks in vain among the pages of the average health report for information which will furnish convincing proof or disproof of the efficiency of past policies and which will guide to an intelligent shaping of future policies.

* Governor Sulzer's Message on Public Health with the Report of Special Public Health Commission, Albany, 1913.

† Baby-Saving Campaigns, Publication No. 3, Children's Bureau, Washington, D. C., 1913, p. 11.

IMPORTANCE OF THE UNIT OF AREA IN THE TABULATION OF
VITAL STATISTICS.

In most cities, at the present time, deaths and other vital facts are tabulated by political divisions, not by sanitary areas. Moreover, the unit of area is too large. It includes many different kinds of sanitary and housing conditions. For practical or scientific use by the sanitary and health officials it is not sufficient to calculate the death rate for an entire city or even a ward. In one part of the ward or assembly district or borough, health conditions may be very good, in another part the conditions may be very bad. To calculate a rate for the entire area shows nothing that is true, for it does not represent either the good or the bad part of the area. And yet, most of our cities publish the tabulations for the entire city or for each borough, or at best by wards.

The general death rate year by year is useful in showing the sum total of success or failure in the efforts to preserve health. The general death rates of two cities may be compared and methods successful in one may be adopted in the other with like favorable results in reducing the rate. But, for active operations in a specific community and for an accurate understanding of causes, as preliminary to social action or action by the health officials, the vital facts are needed for narrower areas. The unit should be a sanitary area, not a political or administrative one, as at present in most cities. It should be permanent—which political areas are not—in order that frequent comparisons may reveal changes in health facts connected with changes in nationality, sanitation, housing, intelligence, and other social conditions. This comparison may reveal the operation of causes. It should be small enough to be relatively homogeneous in the chief conditions which affect health but not so small as to be inaccurate for statistical purposes. Most tables of vital statistics, as at present published by city health departments, are utterly inadequate as a guide for social action and are of little use for scientific purposes.

There is need of a research bureau in connection with the department of vital statistics whose function should be to tabulate the vital facts by smaller areas and make the significant correlations and comparisons. What the health guardians

of a community wish to know is not the infant mortality rate of a whole borough or ward, but in what sections of the city is the rate high, what is the condition of the milk supply in that section, the sanitation, the housing, the intelligence and income of the families, the working conditions of the mother, if she works. Knowing these facts for separate smaller areas and comparing them may show very clearly the causes at work to produce either a high rate or a low rate of infant mortality. In some sections milk stations will then be established, with instruction of mothers and medical care of babies, the milk supply will be better guarded, and the sanitation improved. The result will be observed and the new death rate will show the success or failure of the effort. If the rate were to be calculated for an entire ward or borough, the result of the establishment of milk stations might show in the reduced death rate and yet some very bad health conditions, in certain small sections, still remain concealed by the very good conditions in other sections. Thus, to average results over wide areas with heterogeneous conditions is always dangerous and likely to mislead.

The health official or investigator does not care so much for the death rate from tuberculosis for a borough or an entire city because he wishes to ascertain where the rate is high or low and to find out why. He finds a high death rate from this disease in a section of the city with bad housing, dusty or otherwise dangerous occupations or with inadequate facilities for care of advanced cases, and with this information he is ready to work out a remedy. In this case also if the death rate were calculated over too large an area, the conditions needing remedy might not be revealed but rather concealed by the very good showing of the best sections. Although it is recognized that tuberculosis is an occupational disease, most of our city health departments throw no light, in their published reports, on the relation of deaths to occupation.

The public and the health officials are not interested alone in the contagious disease rate of the entire city, because, while the city may be making a good showing, some section of the city may need a contagious disease hospital very badly. To demonstrate this fact it would be desirable to examine the

sickness and mortality from contagious diseases in smaller areas. This would show the danger spots which really are a peril to the city as a whole. In some sections the population may be so crowded that contagious disease quarantine is difficult to enforce, thus causing the rate to increase. In other sections the people may be engaged in work in their own homes in the tenements and may be endangering the public health through contagion carried by the article manufactured in the home. These are the important facts to be known by the health authorities, and a rate for too large an area will not show the real situation.

There is need for coöperation in making vital statistics most useful. It is clear that, if death and sickness data are collected and tabulated by smaller sanitary areas, the population facts must also be secured by these same areas in order to compute a rate of death or sickness per unit of population. The facts about the housing situation, room-crowding, home work and occupational conditions should also be gathered in these same areas in order that comparisons may be made between mortality and morbidity data and other social and economic facts.

CONCLUSION.

The present paper has attempted to emphasize the purposes for which good vital statistics may be utilized and the results to which they may be expected to contribute their part. Many of the present defects have been pointed out with the idea of indicating how much more effective such facts might be made if properly collected and tabulated and presented to a wider group of citizens, as well as to the health officials themselves. The need for more intensive study over smaller areas of the facts concerning sickness, death, and disability has become imperative for health departments, especially those of the larger cities where conditions are so complex, in order that effort and funds may be concentrated where they are most needed and where they will yield the largest returns in the preservation of health and efficiency and in the promotion of independence and welfare. The public must be educated in health problems by the facts made intelligible to them in order that their coöperation in the health movement may be assured.